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sciences, is entrusted with constituting, at its March meeting, a committee composed of two home and two foreign members, whose duty it shall be to judge of the value of the works. The committee will meet at Budapest in the first fortnight of October, and name from their number a president and a reporter.

In case of a tie the president's vote is preponderant.

It shall be the duty of the reporter to present a detailed report on the committee's decision.

This report is to be read at the general meeting of the Academy of Sciences the day the prize is adjudged.

4. The works of authors on the committee are excluded from the competition, and they are not to be mentioned in the committee's report.

5. The foreign members designated as part of the committee and who, participating in the deliberations, will spend some days at Budapest, shall receive a compensation of 1,000 crowns. The honorarium accorded to the reporter for his work is fixed at 300 crowns.

6. The report is to be published in the journal 'Akadémiai Értesítő.' The Hungarian Academy of Sciences will publish this report abroad, and will make it known to all the associated academies.

In accordance with the above statutes, in the course of this present year the Hungarian Academy of Sciences will confer for the first time the Bolyai Prize, consisting of a medal and ten thousand crowns.

The commission constituted by the academy from its members and endowed with the powers of a jury consists of Gaston Darboux (Paris), Felix Klein (Göttingen), Julius König (Budapest), Gustav Rados (Budapest). The deliberations of this commission will be held this October in Budapest.

If I may be forgiven for a bit of prophecy, I venture to predict the prize goes to Poincaré.

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SPECIAL ARTICLES.

ON THE PROBABLE ORIGIN OF CERTAIN BIRDS.

It is my purpose to examine in this article the status of nine kinds of birds that have been recorded from North America, and one that has been taken in southern Europe, and

to discuss in some detail their relationship and probable origin.

Appended to the 'Check-list of North American Birds' published by the American Ornithologists' Union there is a 'Hypothetical List' consisting of twenty-eight different birds which, for various reasons, have an uncertain status in the bird fauna of the region for which the list is given. Of these twenty-eight birds I shall consider nine, as from the evidence at hand it would appear that together they throw much light on some hitherto obscure problems. The list includes Cooper's sandpiper, *Tringa cooperi* Baird; Brewster's linnet, *Acanthis brewsterii* Ridgway; Townsend's bunting, *Spiza townsendii* (Audubon); Lawrence's warbler, *Helminthophila lawrencii* (Herrick); Brewster's warbler, *Helminthophila leucobronchialis* (Brewster); Carbonated warbler, *Dendroica carbonata* (Audubon); Blue Mountain warbler, *Dendroica montana* (Wilson); Small-headed warbler, *Wilsonia microcephala* (Ridgway); Cuvier's kinglet, *Regulus cuvierii* Audubon.

Of these nine kinds of birds seven either are represented by single individuals or are known only from figures and descriptions in the works of Audubon and Wilson. On the other hand, the two remaining birds of this series are known by numerous specimens, and my reasons for including them will be presented as each is considered in detail.

It seems essential at this point to call attention to the fact that a number of these birds were discovered at a time when field naturalists were not nearly so numerous as at the present day, and that there may be no doubt as to the reality of at least some of these forms, a number of the types still exist, as will presently be shown.

COOPER'S SANDPIPER, *TRINGA COOPERI* BAIRD.

Cooper's sandpiper is known from a single individual that was taken on Long Island in May, 1833. The type is still in the National Museum at Washington. The evident relationship of this bird to the knot, *Tringa canutus* Linnæus, is at once apparent to a student, and even an untrained eye might readily distinguish their similarity. For the

original account of the type of this species the reader is referred to 'The Birds of North America,' Baird, 1858, page 716.

BREWSTER'S LINNET, *ACANTHIS BREWSTERII*
RIDGWAY.

The type specimen of Brewster's linnet was taken by Mr. William Brewster at Waltham, Mass., on November 1, 1870. The bird is a female. The type still exists in the collection of Mr. Brewster at Cambridge, and no other individual of this kind is known. In appearance the bird differs from other members of the genus in which it has been placed by Mr. Ridgway chiefly in lacking the red spot on top of the head and the dusky spot on the chin characteristic of the adults, especially the males of the genus *Acanthis*. Therefore, the exact relationship of this bird is somewhat obscure, though its generic status has not been questioned. For the original description of this species the reader is referred to the *American Naturalist* of July, 1872, page 433.

TOWNSEND'S BUNTING, *SPIZA TOWNSENDII*
(AUDUBON).

On May 11, 1833, Mr. J. K. Townsend, obtained, while collecting, the type specimen on which this form is based. It is an adult male, and remains unique. The relationship of this bird is obvious; it can only be regarded as the close ally of the dickcissel, *Spiza americana* (Gmelin). (Cf. Audubon's 'Ornithological Biography,' Vol. II., p. 183, 1834.)

Commenting on the status of this bird the Committee of the Ornithologists' Union say: 'Its peculiarities can not be accounted for by hybridism nor probably by individual variation.'¹

CARBONATED WARBLER, *DENDROICA CARBONATA*
(AUDUBON).

This bird is known only from Audubon's colored plate and his description of two specimens killed near Henderson in Kentucky in May, 1811. The birds were probably both males. Audubon's account of the event may

¹ 'A. O. U. Check list N. A. Birds,' 2d edition, p. 331, 1895.

be found in the 'Ornithological Biography,' Vol. I., p. 308, pl. 60, 1831.

BLUE MOUNTAIN WARBLER, *DENDROICA MONTANA*
(WILSON).

The Blue Mountain warbler is only known from the works of Wilson and Audubon. The specimens on which they based their descriptions were taken in the Blue Ridge Mountains of Virginia. The bird was figured, but no specimens are at present known. (Cf. Wilson, 'American Ornithology,' Vol. V., p. 113, pl. 44, fig. 2, 1812.)

SMALL-HEADED WARBLER, *WILSONIA MICRO-
CEPHALA* (RIDGWAY).²

This again is one of the species described by both Wilson and Audubon. It is said to have been taken in points so widely separated as New Jersey and Kentucky, but is only known by the colored plates and the descriptions made by the above naturalists. It does not seem probable that with all the careful detailed work that has been done in both regions during the last fifty years the small-headed warbler is till extant. The bird is so widely different from any of its congeners as to make confusion with them impossible, nor has the theory of hybridity been advanced to account for this supposed species. There then remain the two hypotheses as to the status of *Wilsonia microcephala*; either the individuals which came under the observation of Wilson and Audubon were the last survivors of this species which was dying out and has become extinct, or these birds were 'mutations' that occurred ephemerally and did not flourish, but died out almost immediately.³

CUVIER'S KINGLET, *REGULUS CUVIERII* AUDUBON.

On June 8, 1812, Audubon obtained on the banks of the Schuylkill River, at a place called Flatland Ford, in Pennsylvania, the only specimen of Cuvier's kinglet known. If

² *Muscicapa minuta* Wilson (cf. *Am. Orn.*, Wilson., Vol. VI., p. 62, 1812, pl. 1, fig. 5, nec. Gmelin, 1788).

³ Cf. Ridgway, *Pro. U. S. Nat. Mus.*, Vol. VIII., p. 354, 1885.

the bird was preserved the specimen has probably been either lost or destroyed, and we know it only by the admirable plate which Audubon left and by his description of the little bird.⁴

It does not seem probable that other individuals of this species could have escaped the notice of the many competent naturalists who have worked in the area in question since Audubon's time.

The affinities of this little bird appear to be with *Regulus satrapa* and it now seems probable that this was a veritable 'mutation' that did not survive.

In dealing with the foregoing seven species I have tried to find the simplest solution to account for their presence. In view of the light thrown by the succeeding examples and the data regarding the foregoing, already given, the law of parsimony compels me to consider these forms as mutations (which were not perpetuated) from *species still existing* which I have, in most cases, been able to indicate.

We have now to consider the two remaining birds making up the nine North American species. They are Brewster's warbler and Lawrence's warbler.

BREWSTER'S WARBLER, *HELMINTHOPHILA LEUCOBONCHIALIS* (BREWSTER).

The type specimen of *Helminthophila leucobonchialis*⁵ was taken by Mr. William Brewster at Newtonville, Mass., on May 18, 1870. The bird was a male. It was not until April, 1876, some six years afterward, that the bird was named and described by Mr. Brewster. A second specimen⁶ of this species was ob-

tained on May 12, 1877, near Clifton, Pa. It was also a male. The third recorded individual⁷ was killed long before this and was discovered in the collection of the Philadelphia Academy of Natural Sciences labeled 'J. C., October 20, 1862.' The specimen had no history, but was labeled in the handwriting of John Cassin and presumably was at one time in his collection.

By the year 1885 twenty-two⁸ individuals

The bird was a male. It was identical in appearance with the type.

⁷'A Third Specimen of *Helminthophaga leucobonchialis*,' by Spencer Trotter, Philadelphia, Pa., *ibid.*, Vol. III., No. 1, p. 44, 1878. Mr. Trotter discovered a specimen of *H. leucobonchialis* in the collection of the Philadelphia Academy of Natural Sciences, labeled 'J. C., 20 October, 1862,' and also what he made out to be 'Not from Bell.' No sex was indicated. The bird closely resembled the type.

⁸'Some Light on the History of a Rare Bird,' by Spencer Trotter, Philadelphia, Pa., *ibid.*, Vol. IV., No. 2, p. 59, 1879. Mr. Trotter by correspondence discovers that Mr. Bell, a taxidermist in New York, and also a naturalist, who at times assisted Audubon, recalled the fact that in the spring about 1832, at Rockland, N. Y., he shot what he supposed was a young golden-wing warbler, *H. chrysoptera*. He finally sold it to a man in Philadelphia. Mr. Trotter concludes that this is the so-called Cassin specimen. Also that the words 'not from Bell' might mean 'note from Bell.'

⁸'The White-Throated Warbler (*Helminthophaga leucobonchialis*) in Connecticut,' by William Brewster, Cambridge, Mass., *ibid.*, Vol. III., No. 2, p. 99, 1878. Mr. Brewster identifies a fourth specimen collected at Wauregan, Conn., May 25, 1875. The sex was not determined. The bird closely resembled the type. At this time Mr. Brewster regards 'The validity of this distinctly characterized species' 'as established.'

⁹'Capture of a Fifth Specimen of the White-throated Warbler (*Helminthophaga leucobonchialis*),' by William Brewster, Cambridge, Mass., *ibid.*, Vol. III., No. 4, p. 199, 1878. This bird was taken at Suffield, Conn., July 3, 1875. This is an adult male in worn plumage. It differs somewhat from the type, chiefly in being washed with pale yellow on the pectoral region. The yellow on the wings is also restricted and the wing bars are not almost confluent as in the type.

⁴Cf. Audubon, 'Onithological Biography,' Vol. I., p. 288, pl. 55, 1832.

⁵'Description of a New Species of *Helminthophaga*,' by Wm. Brewster, *Bulletin of the Nuttall Ornithological Club*, Vol. I., No. 1, p. 1, 1876. Original description with colored plate.

⁶'Capture of a Second Specimen of *Helminthophaga leucobonchialis*,' by Spencer Trotter, Philadelphia, Pa., *ibid.*, Vol. II., No. 3, pp. 79-80, 1877. Mr. Trotter records in a note the capture of *H. leucobonchialis*, by Mr. Christopher D. Wood, on May 12, 1877, near Clifton, Delaware Co., Pa.

of *H. leucobronchialis* had been secured by different collectors at various points in south-

'Record of Additional Specimens of the White-Throated Warbler (*Helminthophaga leucobronchialis*),' by H. A. Purdie, Newton, Mass., *ibid.*, Vol. IV., No. 3, p. 184, 1879. Mr. Purdie describes four additional birds; a typical specimen collected in Hudson, Mass., in May or June, 1858. This specimen is in the possession of Williams College, Williamstown, Mass. A second bird is from Portland, Conn., where it was collected on May 22, 1875. This is a male and has a decided blotch of yellow on the breast, and a general suffusion of the lower parts with a fainter wash of this shade. There is also a slight suffusion of this color on the upper parts. The third specimen was taken at Saybrook, Conn., and was thus written of by J. N. Clark who collected it: "Took a fine male *H. leucobronchialis*, May 30 (1879); an exceptional specimen, with a patch of bright yellow across the breast from the bend of the wings. Thought it was *pinus* when I fired; notes and habits the same." A fourth bird was shot by Mr. Gunn, in Ottawa Co., Mich., and described as '*H. Gunni*, Gibbs,' in a local newspaper. The bird is a female and was taken on May 25, 1879. It is characterized by a bright yellow breast, the color extending as far down as the abdomen and on the flanks; its crown is particularly brilliant. Mr. Robert Ridgway subsequently identified this bird as *H. leucobronchialis*, Brewster. He also comments on its unusual coloration, but says it 'is in all essential respects like the type' and further that with this 'seventh specimen thus far collected the validity of *H. leucobronchialis* may be considered as established beyond question.' (Cf. *Bull. Nutt. Orn. Club*, Vol. IV., No. 4, p. 233, 1879.)

'*Helminthophaga leucobronchialis* in New York,' by A. K. Fisher, M.D., Sing Sing, N. Y., *ibid.*, Vol. IV., No. 4, p. 234, 1879. Records an adult male taken at Sing Sing, N. Y., on August 24, 1879. The bird had a band of yellow across the breast and a slight suffusion of pale yellow on the throat; the wing bars were 'whitish, whiter even than *H. pinus*. The back is that of a typical *H. leucobronchialis*.'

'Two More Specimens of *Helminthophaga leucobronchialis* from Sing Sing, N. Y.,' by A. K. Fisher, M.D., Sing Sing, N. Y., *ibid.*, Vol. VI., No. 4, p. 245, 1881. Records the capture of a probable female 'having a black auricular patch.' This bird was taken on July 24, 1881, near Sing Sing, N. Y. Also a specimen from the same

ern New England, the lower Hudson River Valley, New Jersey, Pennsylvania, Virginia

region August 3, 1881, sex not given, 'with a yellow pectoral band, * * * the wing-bands were normal; yellow, not white.'

'Another Example of *Helminthophaga leucobronchialis* from Connecticut,' by John H. Sage, Portland, Conn. (and a footnote by William Brewster), *Auk*, Vol. I., No. 1, p. 91, 1884. Records the capture of a female at Deep River, Conn., on May 18, 1880. Mr. Brewster says in the footnote: 'It differs from the type * * * in having the yellow of the forehead partially obscured, * * * in the unusual restriction of the wing-bands, and in the generally immature appearance of the plumage.' These characteristics, he says, 'are just what would be expected in the female of this species.'

'Occurrence of *Helminthophila leucobronchialis* in Virginia,' by William Palmer, Smithsonian Institution, Washington, D. C., *Auk*, Vol. II., No. 3, p. 304, 1885. Records the capture of a male near Fort Meyer, Arlington, Va. The specimen is typical.

'A Specimen of *Helminthophila leucobronchialis* in New Jersey,' by C. B. Riker, New York City, *Auk*, Vol. II., No. 4, p. 378, 1885. Records a male collected at Maplewood, Essex Co., N. J., May 11, 1883. First record for the state. Very gray on the back, this bird has an indistinct yellow breast band and whitish wing bars much as in *pinus*, very conspicuously separated.

For change of generic name cf. Ridgway, *Bull. Nutt. Orn. Club*, Vol. VII., No. 1, p. 53, 1882.

'Capture of Two More Specimens of *Helminthophila leucobronchialis* at Sing Sing, New York,' by A. K. Fisher, M.D., Sing Sing, N. Y., *Auk*, Vol. II., No. 4, p. 378, 1885. Records the capture of two specimens at Sing Sing, N. Y., on August 11, 1883. "The under parts of both specimens are much more deeply suffused with yellow than is the case in any of my other three specimens; in fact, the yellow on one is evenly distributed over the entire under surface, but is not so deep as in *Helminthophila pinus*."

Cf. Ridgway, *Auk*, Vol. II., No. 4, pp. 359-363, October, 1885.

Cf. Thurber, *Auk*, Vol. III., No. 3, p. 411, 1886.

Remark. These are all the recorded individuals up to the end of 1885, but I have reason to think that there are a number of known specimens that were not recorded, and which were taken between 1878 and 1885.

and Michigan. However, the birds are most common about the lower reaches of the Connecticut and Hudson rivers. At the present writing I have no doubt that in all the collections in the country there are at least 150 individuals of *H. leucobronchialis* and, moreover, it is entirely possible, at the proper season and locality, to observe these birds annually.

Again I must insist upon the importance of considering carefully the history of the appearance of this and other probable 'mutations.' It is not likely that a form or kind of bird so common as *H. leucobronchialis* is at the present time, and ranging over as large an area as from Pennsylvania to Massachusetts and from Virginia to Michigan, should remain unknown to the earlier ornithologists, such keen field naturalists as Audubon and Wilson, Baird, Lawrence, Coues and Prentiss. Nuttall made careful and prolonged study of birds in the region where Mr. Brewster collected the type. Yet none of these close observers and good collectors either recorded or secured an individual of this kind. Clearly then, the presumption is that this bird could not have been so common early in the last century as it is now, if indeed it existed at all at that time. Nor does it seem that the theory of hybridity⁹ is supported when we

⁹'On the Relationship of *Helminthophaga leucobronchialis*, Brewster, and *Helminthophaga lawrencei*, Herrick; with some Conjectures Respecting Certain other North American Birds,' by William Brewster, *Bull. Nutt. Orn. Club*, Vol. VI., No. 4, pp. 218-225, 1881. Basing his hypothesis upon similarity of color and marking, Brewster considers these birds hybrids and says: 'Taken as a whole, this series (of seven specimens) perfectly connects *leucobronchialis* with *pinus*, as well as showing an extension of the former towards *chrysoptera*.'

'*Helminthophila leucobronchialis*,' by Robert Ridgway, *Auk*, Vol. II., No. 4, pp. 359-363, 1885. Assumes *Helminthophila leucobronchialis* to be a distinct species which hybridizes with its allies, thus accounting for the number of aberrant specimens.

'*Helminthophila leucobronchialis* in New Jersey,' by E. Carlton Thurber, Morristown, N. J., *Auk*, Vol. III., No. 3, p. 411, 1886. Records the

consider the vast number of known specimens already in collections and the fact that it is possible to observe living specimens, as I have indicated, each year. I am aware that many capture by Mr. Auguste Blanchet of a specimen about ten miles from Morristown, in May, 1859. He says: 'The whole plumage resembles somewhat that of the female *H. chrysoptera*, but the grayish on the breast is not so deep.' Mr. Thurber regards this bird as a hybrid.

'An Interesting Specimen of *Helminthophila*,' by William Brewster, Cambridge, Mass., *Auk*, Vol. III., No. 3, pp. 411-412, 1886. Records another specimen taken by Mr. Frank Blanchet two miles from Morristown, N. J., on May 15, 1884. The sex was not determined. Mr. Brewster writes of this specimen that it '* * * is apparently a hybrid between the hybrid *H. lawrencei* and the typical *H. pinus*.' After describing the bird with much detail he adds: "In briefer terms, this interesting bird may be said to be about intermediate in color and markings between typical *pinus*, with its short narrow eye-stripe and uniformly yellow underparts, and the so-called *H. lawrencei*, which has a broad black patch extending from the bill through and beyond the eye, and the chin, throat and forepart of the breast solidly black. It forms an important link in the chain of evidence supporting my theory (*Bull. Nutt. Orn. Club*, Vol. VI., No. 4, pp. 218-225, 1881) that *H. pinus* and *H. chrysoptera* frequently interbreed, and that their offspring perpetuate a variously characterized hybrid stock by breeding back into one or the other parent strains."

'The Significance of Certain Phases in the Genus *Helminthophila*,' by Spencer Trotter, M.D., *Auk*, Vol. IV., No. 4, pp. 307-310, 1887. Accepting the theory of hybridity, Dr. Trotter believes, because of its apparent common occurrence, as represented in the many specimens of *H. leucobronchialis*, that it indicates the degeneracy of the species producing this hybrid. He concludes, therefore, that the extinction of *chrysoptera* and *pinus* is in process, and perhaps imminent.

'Notes on Birds Observed in the Vicinity of Englewood, New Jersey,' by Frank M. Chapman, *Auk*, Vol. VI., No. 4, pp. 302-305, 1889. Mr. Chapman writes of *leucobronchialis* as 'this puzzling hybrid.'

Cf. Ridgway, 'Manual of North American Birds,' 1896, footnotes on page 486. Mr. Ridgway advances the dichroic theory plus hybridity to account for *lawrencei* and *leucobronchialis*.

good field ornithologists declare that they have seen either *Helminthophila leucobronchialis* or *H. pinus* attending young which they supposed to be *H. leucobronchialis*. And it is also on record that a parent *leucobronchialis* was observed with two young, feeding them. This bird was observed with these young ones two different days in the same locality. But two young composed the brood, and Dr. Bishop, who saw and collected them, writes: 'A careful search on both days through the adjacent country failed to disclose any other member of the genus *Helminthophila*.' He believed the parent bird to be a female and also concluded, though the two young were still in the down plumage of nestlings, from the final feathering that showed through, that: 'One, and probable that the other, would have become a typical specimen of *H. pinus*.'

These facts¹⁰ would in themselves seem to

¹⁰ 'Notes on *Helminthophila leucobronchialis*,' by Edwin H. Eames, Seymour, Conn., *Auk*, Vol. V., No. 4, pp. 427-428, 1888. Records the capture or observation of six adult and several young in a brood, between May 26, 1888, and June 22, of the same year, near Seymour, Conn. From this series of notes I quote Mr. Eames, writing of *H. leucobronchialis*, the date being June 3: "At last with more eagerness than usual it descended, and disappeared in the bushes (an unusual occurrence), where it apparently took possession of its nest, as in less than half a minute thereafter an *H. pinus*, the first I had seen in the neighborhood, flew hastily from about the same place. This occurred at about sunset, and between that and dark *leucobronchialis* did not again appear in sight. I had previously had it in view, or could hear its song, almost continuously. On several days following I searched this thicket thoroughly, as it seemed, and once succeeded in flushing a *pinus*, but could not even then find its nest. In company with *pinus*, *leucobronchialis* cautiously approached and surveyed me for a short time, then departed with no apparent misgivings. At all other times *leucobronchialis* was near by and always reconnoitered the track of my careful search when I had moved to some distance, then, apparently satisfied, pursued its avocations as before. I was not able to visit the spot again until June 17, and neither then nor since have I found this *leucobronchialis*, but I did find a brood of several young being fed

controvert the theory of hybridity, for, though hybrids do occur among wild birds, they can by an *H. pinus*, possibly the result of a union between the two. These two birds were the only ones of the genus which I had at any time detected in the locality."

'Notes on the Blue-winged Warbler and its Allies (*Helminthophila pinus*, *H. leucobronchialis*, *H. lawrencei* and *H. chrysoptera*) in Connecticut,' by Edwin H. Eames, *Auk*, Vol. VI., No. 4, pp. 305-310, 1889. Speaking of the comparative abundance of *H. chrysoptera* and *H. leucobronchialis* in southern Connecticut, Mr. Eames writes: "Of *H. chrysoptera* but little can be said, as it is properly considered a rather rare bird here, and our yearly records are but few, usually less than half a dozen."

"The beautiful *H. leucobronchialis* is much (?) more common than the latter (*chrysoptera*) and is eagerly sought after by most of our collectors, latterly with good success considering its former (supposed) rarity." During the spring of 1889 he procured five specimens, and recorded the breeding of *leucobronchialis* as follows: "Mr. C. K. Averill, Jr., of this city, found a *leucobronchialis* early in June. * * * June 24 I accompanied him to the place and we soon had the pleasure of watching the bird at shorter range than I think has fallen to the lot of others, *i. e.*, three to ten feet. * * * It came to the same conspicuous clump of bushes and briar many times, with from one to five minutes' intermission, each time with one or more small worms, about three quarters of an inch long, first reconnoitering, then cautiously approaching, and again hastily leaving a part of this clump of bushes not over two feet in extent. We failed to discover the identity of the object of its cares, but I have reason to believe it was a young cowbird. The rest of this brood was being fed by the only *H. pinus* (a female) to be found in the neighborhood. * * * They showed a marked general similarity to the young of *pinus*. I shot this male *leucobronchialis* August 8 and also one of the young, carefully observing that the others were similar to the one killed, which was altogether too familiar with the adult bird to allow a possibility of doubt concerning its male parent."

"In this, as in many other species of our smaller birds, such an affection is shown for the haunts occupied during the nesting period that they rarely leave them until after moulting, or even till the commencement of the fall migration. In the above case I never failed to find the birds

be considered at best as only casual, and the infertility of hybrids, especially among the

within the bounds of a two-acre tract of land."

'On the Breeding of *Helminthophila pinus* with *H. leucobronchialis* at Englewood, New Jersey,' by Frank M. Chapman, American Museum of Natural History, New York City, *Auk*, Vol. IX., No. 3, pp. 302-303, 1892. Record of typical male *H. pinus*, breeding with non-typical female *H. leucobronchialis*. Description of nest and eggs. This pair of birds deserted the nest and further observation could not be made.

'Notes from Connecticut,' by E. H. Eames, Bridgeport, Conn., *Auk*, Vol. X., No. 1, pp. 89-90, 1893. Mr. Eames writes: "* * * while on the other side and within a stone's throw a beautiful Brewster's warbler spent the greater part of his time. The latter after patient watching revealed his mate, a blue-winged warbler, and a nest in course of construction. * * * When seen again, on June 14, it contained four eggs, two of which were cowbirds', which were removed. Those remaining brought forth a pair of birds that, as they left the nest, could not be distinguished from normal young of the female parent, as would be expected, whatever the color of the male."

'*Helminthophila leucobronchialis*,' by Louis B. Bishop, M.D., New Haven, Conn., *Auk*, Vol. XI., No. 1, pp. 79-80, 1894. "On July 1, 1893, I found an adult *H. leucobronchialis* with two young in a small tract of alder swamp and woodland of North Haven, Conn. They were little disturbed at my presence, and I watched them carefully for some time. The adult fed both young at short intervals, leaving little doubt of its relationship to them. On July 4 they were still in the same locality, and I collected all three. Possibly the remainder of the family had been killed, as a careful search on both days through the adjacent country failed to disclose any other member of the genus *Helminthophila*.

"Decomposition was so far advanced before I could prepare the adult that I was unable to determine its sex. The fact that it never sang while I was watching it, together with the generally dull color of its plumage, lead me to think it a female.

"Unfortunately both of the young were still principally in the olive, downy plumage of nestlings, but enough of the final feathering had appeared on the throat, breast and upper parts to make it certain that one, and probable that the

higher animals, is too well known to need further comment here. If it be conceded then as improbable that over one hundred cases of wild hybridity have occurred between *H. chrysoptera* and *H. pinus*, only one other conclusion can be reached, namely, that from one of these warblers (probably *H. pinus*) there began to occur 'mutations' that have increased in geometrical progression and have finally grown sufficient in number to become themselves a parent stock, though it seems probable that the 'mutations' are still occurring from the ancestral stock, as witness the observations of good field ornithologists alluded to above, who say they have seen *H. pinus* feeding young which they supposed to be *H. leucobronchialis*. They supposed the young to be *H. leucobronchialis*, because in every case one of the parents was *H. leucobronchialis*, but, on the other hand, in every case, one of the parents was an *H. pinus*. Now the cases where such conditions have prevailed are five in number. It is significant that while the generally accepted hypothesis to account for the origin of *H. leucobronchialis*, is that *H. chrysoptera* has crossed with *H. pinus*, the result being a hybrid, *H. leucobronchialis*, yet in no case has any naturalist asserted that he has seen *H. chrysoptera* feeding young supposed to be *H. leucobronchialis*.

I am aware that there are two cases¹¹ of the other would have become a typical specimen of *H. pinus*. The wing-bars of the young differ, being in the most mature specimen narrow and almost white, and in the other broader and light yellow."

¹¹ 'Evidence concerning the Interbreeding of *Helminthophila chrysoptera* and *H. pinus*,' by A. K. Fisher, M.D., Sing Sing, N. Y. "On July 4, 1885, while collecting specimens in a piece of woods underlaid by a scattering undergrowth, I came upon a female golden-winged warbler busily engaged in collecting insects. As I stood watching her she flew to a neighboring cedar tree and commenced to feed a young bird. I immediately shot and killed the latter as the female flew away. The noise of the discharge started another young bird from some bushes near by, and as it flew the female flew and alighted near it. Just as I was on the point of firing they started,

mating of *H. chrysoptera* with *H. pinus*, but in the first of these, as will presently appear, the male parent is hypothetical. It is to be noted that in the first case Dr. Fisher found a female *H. chrysoptera* feeding a young *H. pinus* in a cedar tree. Upon the shooting of this fledgling the old female flew away; the shot startled another young bird from some bushes near by, and as it flew the female also

and I succeeded in wounding the female only and had to follow and kill her with a second shot. On my return to the place where I first shot at her, I could not find the young one, nor did a careful search disclose it. In advancing for a nearer shot I had a good opportunity of seeing the young bird: it closely resembled its mother in appearance and had no yellow on the breast, whereas the one killed was the exact counterpart of the young of the blue-winged yellow warbler, with its yellow breast and white wing-bars. In all probability the father of this interesting family was a specimen of *Helminthophila pinus*."

This is the entire account of the incident. (W. E. D. S.)

'The Interbreeding of *Helminthophila pinus* and *H. chrysoptera*,' by John H. Sage, Portland, Conn. "On June 13, 1889, Mr. Samuel Robinson, who has collected with me here for the past fifteen years, noticed a male *Helminthophila pinus*, with food in its bill, fly and disappear at the foot of a small alder. A female *Helminthophila chrysoptera* soon appeared, also with food, and was lost to sight at the same spot as the other bird. On going to the locality five young birds flew from the nest and alighted on the bushes in the immediate vicinity. Both parent birds were soon feeding the young again. He shot the old birds and secured all the young, which, together with the nest, are in my cabinet.

"* * * The male (*pinus*) is a very bright specimen with white wing-bars, edged with yellow. The female (*chrysoptera*) is strongly marked with yellow below, the wing-bars being exceptionally rich with the same color.

"The young, two males and three females, are all similar, and have the head, neck, chest, sides and back olive-green. Abdomen olive-yellow. Remiges like adult *pinus*. Two conspicuous wing-bars of light olive edged with yellow."

This is the entire account of the incident, except a description of the locality, the nest and its situation. (W. E. D. S.)

flew and alighted near it and was then shot. The young bird that was killed 'was the exact counterpart of the blue-winged yellow warbler' (*H. pinus*), while the second bird carefully observed resembled the adult bird that was shot, and was, therefore, apparently a young *H. chrysoptera*. No male parent was seen nor were any other young observed.

Granting that both of these fledglings were the progeny of the bird seen feeding one and associated with the other, and also granting that the unknown male parent of both these young birds was *H. pinus*, neither of the young was *H. leucobronchialis*, the hybrid which it is asserted is the result of such a union.

The second case which is recorded by Mr. Sage goes on to state that a male *H. pinus* and a female *H. chrysoptera* were discovered feeding five young in a nest; these birds flew out of the nest on being approached, whereupon all seven were collected. The author says that the male was typical *pinus* and the female typical *chrysoptera*, 'strongly marked with yellow below.' The five young proved to be two males and three females and 'are all similar,' being olive green in color, becoming olive yellow on the abdomen and having the wings like young *pinus*. Surely these young are not *leucobronchialis*, and while the interbreeding of *chrysoptera* and *pinus* is hereby thoroughly established as a rare and casual occurrence, these hybrid young, the result of this union, so far as I can perceive, are a direct refutation of the hybrid theory, which attempts to account for the origin of *H. leucobronchialis*.

On the other hand, we have direct evidence that both *H. leucobronchialis* and the rarer *H. lawrencei* have mated and bred and reared young with *H. pinus*.

In view of the foregoing facts, I am of the opinion that in *H. leucobronchialis* and in *H. lawrencei*, presently to be considered, we have examples of two separate and distinct 'mutations' from a common parent stock or species. That is, I believe that *H. pinus*, early in the last century became unstable as

a species¹² and began to throw off what must be considered as 'mutants,' taking de Vries's definition of the word. In other words, *H. pinus* is alone responsible and is the direct ancestor of both *H. leucobronchialis* and *H. lawrencei*; that these 'mutants' have up to the present time generally bred back into the parent stock, and that in so doing the instability of *H. pinus* has increased geometrically with the constant result of the increasing number of both kinds of 'mutants.'

LAWRENCE'S WARBLER, *HELMINTHOPHILA*
LAWRENCEI (HERRICK).

Previous to Mr. Brewster's description of *Helminthophila leucobronchialis*, Herrick described¹³ a bird which he named *Helminthophila lawrencei*. The affinities of this species are evidently with *H. pinus*, which it resembles in many ways, but from which it differs in being bright olive green above, and in having the ear coverts black and an area on the throat the same color.

At the time of this writing, between twenty and twenty-five¹⁴ specimens are known, there

¹² Cf. Bishop, *Auk*, Vol. XXII., No. 1, pp. 21-24, 1905. "In southern Connecticut there are three distinct forms of the blue-winged warbler (*H. pinus*) taking males alone into consideration—the ordinary form with rich gamboge-yellow lower parts, white wing-bars and bright olive-green back; a second form like the last but with gamboge-yellow wing-patch, resembling the golden-winged (*H. chrysoptera*), which is much the rarest; and third, a form with pale yellow lower parts, much paler back, and with usually yellow wing-bars; and between the three occur all sorts of intermediates.

¹³ *Proceedings of the Academy of Natural Sciences of Philadelphia*, p. 220, plate 15, 1874.

¹⁴ 'Description of a New Species of *Helminthophaga*, by Harold Herrick, *Proceedings of the Academy of Natural Sciences of Philadelphia*, 1874, p. 220, pl. 15.

'Capture of a Second Specimen of *Helminthophaga lawrencei*,' by Harold Herrick, *Bull. Nutt. Orn. Club*, Vol. II., No. 1, pp. 19-20, 1877. Records the capture of a second specimen which Mr. George N. Lawrence obtained from a dealer who told him that it was taken near Hoboken, N. J., in the spring of 1876. It was apparently a male and closely resembled the type.

being some confusion as to three of them. These birds are generally believed to be hybrids or crosses between *H. pinus* and *H. chrysoptera*.¹⁵ But no one has ever intimated that they have seen *lawrencei* mated with *chrysoptera*, or *chrysoptera* feeding young

'A Third Specimen of Lawrence's Warbler,' by Clark G. Voorhees, New York City, *Auk*, Vol. V., No. 4, p. 427, 1888. Records the capture at Rye, Westchester Co., N. Y., on August 31, 1888, of an adult male. The third known specimen.

'*Helminthophila pinus*, *H. chrysoptera*, *H. leucobronchialis* and *H. lawrencei* in Connecticut in the Spring of 1888,' by Louis B. Bishop, M.D., New Haven, Conn., *Auk*, Vol. VI., No. 2, pp. 192-193, 1889. Records the capture of three specimens: a female at New Haven, May 21, a female at Stamford, May 23, and a male at the same place on May 25. This makes six known specimens.

Cf. *op. cit.*, *Auk*, Vol. I, No. 1, pp. 305-310. Records by E. H. Eames of the capture of an adult male at Bridgeport, Conn., on May 16, 1889, and hearing this bird in full song. This is the seventh one known.

'Notes from Connecticut,' by E. H. Eames, Bridgeport, Conn., *Auk*, Vol. X., No. 1, pp. 89-90, 1893. Mr. Eames records: 'Four Lawrence's warblers were within a radius of half a mile, three typical and one with the black obscured and the crown dull yellow-olive, * * *.' This brings the known number of this bird up to eleven.

'Notes on *Helminthophila chrysoptera*, *pinus*, *leucobronchialis* and *lawrencei* in Connecticut,' by John H. Sage, Portland, Conn., *Auk*, Vol. X., No. 2, pp. 208-209, 1893. Mr. Sage records a single example, a male taken on May 14, 1887. This is the twelfth known specimen.

'Notes Concerning Certain Birds of Long Island, N. Y.,' by William C. Braislin, M.D., *Auk*, Vol. XX., No. 1, pp. 50-53, 1903. "At Cold Spring Harbor, Long Island, May 8, 1902, a specimen of Lawrence's warbler was secured. * * * is a male, and seems perfectly typical." This appears to be the thirteenth bird of this kind recorded.

Cf. Thurber, *True Democratic Banner* (newspaper), Morristown, N. J., November 10, 17 and 24, 1887. Records a specimen.

¹⁵ '*Helminthophila leucobronchialis*,' by Robert Ridgway, *Auk*, Vol. II., No. 4, pp. 359-363. Ridgway argues from the color pattern of the type and the second recorded bird (see above), and

that were like *lawrencei*, while, on the other hand, we have three records of the breeding of *lawrencei*.¹⁶ First, a female feeding young (*it is to be noted in this case both parents were H. lawrencei*), the male having been shot

an adult female taken at Highland Falls, N. Y. (cf. Brewster), that these three birds are hybrids between *H. chrysoptera* and *H. pinus*.

'The Coloration and Relationship of Brewster's Warbler,' by Gerald H. Thayer, Monadnock, N. H. Regards *H. lawrencei* as a hybrid between *H. pinus* and *H. chrysoptera* because of its color pattern and its rarity.

Cf. Bishop, *Auk*, Vol. XX., No. 1, pp. 21-24, 1905.

¹⁶ 'Connecticut Notes,' by A. H. Verrill, New Haven, Conn., *Auk*, Vol. X., No. 3, p. 305, 1893. Mr. Verrill writes: "On May 6, 1893, * * * I procured an adult male Lawrence's warbler. May 31, I noticed a Lawrence's warbler which I thought was breeding. On June 5 I again noticed the bird and shot it, and, after hunting some time; I finally flushed the female from her nest which, unfortunately, contained six young birds. I had a very good chance to examine her as she was constantly within six or eight feet from me. The nest was in all respects precisely like that of the blue-winged warbler. The young birds were well feathered out, and several of them showed traces of black on the throat."

["The really unfortunate part of the affair seems to have been not that the writer was disappointed in his hopes of a set of eggs, but that he failed to capture and rear the young and to secure the female—that he threw away a rare opportunity of casting much light on the status of this doubtful species.—Eds." *Auk*.]

'Connecticut Notes,' by Clark Greenwood Voorhees, New York City, *Auk*, Vol. XI., No. 3, pp. 259-260, 1894. "On the 12th of July (at Greenwich, Conn.), while looking for *Helminthophila*, I took an adult female, *H. lawrencei*. The bird is in every way like the female *H. pinus*; excepting that the throat patch and stripe through the eye, which in the male *H. lawrencei* are black, are in this specimen dusky olive-green. The specimen is quite similar to the one taken by Mr. H. W. Flint in New Haven several years ago.

"The young in first plumage which this bird was attending when shot was in every respect typical *H. pinus*. The male parent was not found, but I feel confident that it was *H. pinus*, as the

just previously. There were six young in this brood, which was not further disturbed, and several of the nestlings, presumably young males, showed traces of black on the throat. Second, a female *H. lawrencei* discovered attending a brood of what appeared to be young *H. pinus*. The male parent was not seen. Third, a male *H. lawrencei* mated with a female *H. pinus*, both parents attending six young (in the nest) which resembled in plumage typical nestlings of *H. pinus*.

Moreover, the number of known specimens (plus twenty) is in itself an argument against the theory of hybridity difficult to overcome. As before stated, I believe that here again we have a mutation from *H. pinus*, which has not flourished to the extent that has *H. leuco-bronchialis*.

The next fifty years should go far toward telling the story in regard to both of these birds and it behooves *every good field naturalist not to add more specimens of these birds to our collections, but to carefully observe them as they exist, alive*; to make, if possible, a comparative census of them in given localities where they are of regular occurrence, and to do this annually for many years to come. Much light, too, may be thrown on their relationship by observing with greater care than has heretofore been given the parentage of *all* the different nests of *Helminthophila*, in any

young were well feathered and showed clearly well-defined black lores of the latter."

'Breeding of Lawrence Warbler in New York City,' by C. William Beebe, curator of ornithology, New York Zoological Park, *Auk*, Vol. XXI., No. 3, pp. 387-388, 1904. Mr. Beebe records the discovery of this bird breeding in the Bronx Park. The birds were observed from May 18 until June 16, 1904. The nest was discovered early in June. A male *H. lawrencei*, typical in appearance, was mated with a female which appeared to be a typical *pinus*. On June 13 *both parents* were observed feeding the six young in the nest. The observers were within eight feet of the birds at this time. The nestlings upon examination were all in the *typical nesting plumage* of *H. pinus*, and showed no traces of the black markings of *H. lawrencei*. Very wisely these birds were not disturbed or collected and it will be interesting to watch future developments in this locality.

territory where *leucobronchialis* and *lawrencei* occur.

Thus far I have dealt with North American birds, but there is an additional instance from Italy that demands attention in this connection. In the year 1900 Professor Henry Hillyer Giglioli described a supposed new species of owl which he named *Athene chiaradiæ*.¹⁷ This bird was discovered alive in the possession of a shoemaker at Caneva di Sacile. Its origin was traced back to a shepherd boy, who said that he took it from a nest in a crevice in a stone wall. There were four nestlings in this brood. After a day or two all but one of the young escaped. The locality Pizzocco is on the Prealps of Friuli.

This little owl was plainly related to a species, *Athene noctua*, common in this region, but it differed in having 'the tone and the pattern or style of the coloration,' so notable as to at once distinguish it from its ally; moreover, it had *dark brown irides*, which appeared black in the living bird. This in itself is remarkable, inasmuch as all the owls of the genus *Athene* have yellow irides.

By the year 1903 nine similar owls had been secured or observed, but all of them were found in nests, where some of their brothers or sisters were the yellow-eyed *A. noctua*. The parent birds of at least two of the nine known representatives of *A. chiaradiæ* are known to be true *A. noctua*.

These nine records were only secured after infinite painstaking effort, and I quote part of Professor Giglioli's conclusions in his article in the *Ibis*:

"And now for an attempt to explain the very strange and novel case. Of course, after what is now known, my first supposition that *A. chiaradiæ* might have been one of the last survivors of a species on the verge of extinction falls to the ground. But the opposite hypothesis, that we have in this singular small owl a case of *neogenesis*

¹⁷ H. H. Giglioli, 'Intorno ad una presunta nuova specie di *Athene* trovata in Italia,' in *Avicula*, IV., fasc. 29-30, p. 57 (Siena, 1900). Reprinted in 'Ornis,' XI., p. 237 (Paris, 1901).

'The strange case of *Athene chiaradiæ*,' by Henry Hillyer Giglioli, H.M.B.O.U., etc. *Ibid.*, Vol. III., 8th series, pp. 11-18, pl. I., 1903.

—i. e., the *ex abrupto* formation of a *new type* with sufficient differential characters to constitute, if maintained, a *new species*—can, I believe, be upheld.

"The term *neogenesis* was first used to explain this sudden origin of new forms from old-established species, if I am not mistaken, by my friend and colleague Professor Paolo Mantegazza, many years ago; it has been since used, more or less in the same sense, by the late Professor Cope and by others. I have no intention here of making any attempt to explain the causes which may bring forth such a result; they are necessarily various and usually occult. Suffice it to say that without a strong perturbation of the force of heredity such primary causes would give no result.

"Now, if in the case of *A. chiaradiæ* we have indeed an instance of true *neogenesis*—and the divergence of the parent birds from the normal type of *A. noctua* in different directions would go some way to prove that in them the force of heredity had been disturbed—we have before us an attempt at the formation of a new species, a case of singular and intense interest. I can not but consider it as an attempt, so far, for it is very possible that the couple of somewhat anomalous *A. noctua* now dead—which generated in all probability the four and perhaps eight *A. chiaradiæ* born at Pizzocco, and which possibly may also have been the parents of the couple from which the specimen at Fregona (at no great distance) was born—were alone endowed with the faculty of generating the black-eyed form, and they can do so no more. Again, should any of their black-eyed offspring have survived or should the occult primary causes leading to this singular case of *neogenesis* yet exist, and should in northeast Italy or elsewhere individuals of *A. chiaradiæ* be again produced and be able to breed freely, we can not guess whether or not the force of heredity, regaining its full sway, may fix, so to speak, the differential characters of specific value which suddenly emerged in the first specimens of *A. chiaradiæ*, or else, turning back to an easy atavism, alter the black-eyed form again to the original yellow-eyed *A. noctua*.

"In the first case a *well-defined* and *remarkable* species would be established; in the second my *A. chiaradiæ* would disappear. In either case I opine that the name that I have given to the black-eyed civetta should be maintained, for it is of obvious scientific interest to save this important case from oblivion. It will require several

generations, under the most favorable hypothesis, viz., that more *A. chiaradiæ* be produced, to enable us to decide whether or not a new species of *Athene* has been formed.

"As to any other hypotheses to explain the formation of *A. chiaradiæ*, I can but repeat that I reject both that based on *hybridism*, and that of a *teratological* or *pathological* cause. Hybrids always show traces of the characters of both parents, especially when, as would be the case in *Athene*, of sheer necessity the connubium can not but occur with a species of such very distinct genera as *Nyctala*, *Scops* and possibly *Glaucidium*; now *A. chiaradiæ* is purely and simply an *Athene*, and shows no trace whatever of the characters, either specific or generic, of any of the forms quoted above. As to a *teratological* or *pathological* origin, a mere glance at one of the black-eyed civette will show that they can not owe their origin to such a cause. Besides in such cases, as again in hybrids, the form produced varies, and in these black-eyed descendants of *A. noctua* the specimens thus far examined are perfectly alike. The only instance in which we find perfect similarity in pathological descendants is in cases of absolute *albinism* or *melanism*, or, to put it better, in *monochroic* varieties.

"I believe that neogenesis gives a logical explanation of the strange case of *A. chiaradiæ*. But neogenesis, which appears to be of frequent occurrence amongst plants, has rarely been noted in animals, and I believe never before amongst vertebrata in a wild state.

"Finally, as I have said before, neogenesis may or may not lead to the establishment of a new species."

The conclusions arrived at by this eminent Italian naturalist, which have just been quoted at length, appeal to me strongly and force me to endorse the view he has so ably presented.

In the light of the evidence set forth only one answer can be made to the question as to the part that the process defined by de Vries as 'mutation' is playing among higher animals to-day. Beyond doubt we have witnessed the birth of new species of birds during the past seventy years. Moreover, some of these new species have flourished so as to have become a salient part of the bird fauna in the region where they occur and where they were unknown to skilled ornithologists, who care-

fully studied these regions in the early part of the last century.

WILLIAM E. D. SCOTT.

WORTHINGTON SOCIETY FOR THE
INVESTIGATION OF BIRD LIFE.

BOTANICAL NOTES.

NORTH AMERICAN FLORA.

SOME years ago a group of American botanists under the leadership of Professor Doctor N. L. Britton proposed to undertake the preparation of a comprehensive botanical work which was to bear the name 'Systematic Botany of North America.' One part, consisting of a few pages, was issued, since which nothing further has appeared. Botanists everywhere will be much pleased to know that in this interval work has gone forward, and that publication has been resumed. The title is now 'North American Flora' (instead of 'Systematic Botany of North America'), and its scope has been considerably extended, so as now to include the whole of North America from Greenland to Panama and the West Indian Islands.

As projected the work will include thirty volumes, which are to appear in from 120 to 150 'parts.' The volumes have been assigned as follows: Vol. 1, Mycetoza, Schizophyta, Diatomaceae; 2 to 10, Fungi; 11 to 13, Algae; 14 and 15, Bryophyta; 16, Pteridophyta and Gymnosperms; 17 to 19, Monocotyledons; 20 to 30, Dicotyledons.

The magnitude of the work may be estimated from the fact that the part before us includes eighty pages. It will be published by the New York Botanical Garden, through the aid of a fund bequeathed by Charles P. Daly. The first part issued (bearing date of May 22, 1905) is Part 1 of Volume 22, beginning with the order Rosales, under which are monographed the families Podostemonaceae (by G. V. Nash), Crassulaceae (by N. L. Britton and J. N. Rose), Penthoraceae and Parnassiaceae (by P. A. Rydberg). The descriptions are concise and the synonymy full. Type localities, distribution and illustrations are cited. Metric measurements are used exclusively. Keys to families, genera and species are given.